

## Installation Issues with the SAS<sup>®</sup> System and NetWare 4

Gerardette Furlow, N.C. State University, Raleigh, NC.

### ABSTRACT

Integrating the SAS System efficiently and effectively in a networked environment is a task that the SAS Software consultant is faced with for each new release of the SAS System. There are configuration issues that must be addressed for the fileserver and the client workstations for the integration to work smoothly. This paper will focus on the network installation of the SAS System for Microsoft Windows Release 6.12. Particular emphasis will be placed on the integration of the SAS System within a Novell NetWare 4 environment.

### INTRODUCTION

The purpose of this paper is to give the SAS Software consultant or the systems administrator an overview of some of the configuration requirements and options that can be used when installing or integrating the SAS System for Microsoft Windows Release 6.12 in a Novell NetWare 4.11 environment. This paper will focus on the following areas: configuration issues and system requirements for the SAS System and NetWare 4.11, an overview of NetWare 4.11, the Novell Application Launcher (NAL) 2.0, and a few known integration issues for the SAS System and NetWare 4.11.

### CONFIGURATION ISSUES AND SYSTEM REQUIREMENTS FOR THE SAS SYSTEM FOR MICROSOFT WINDOWS RELEASE 6.12

Before installation of the SAS System begins, it is important to review the system requirements, so that you can make sure that your software and hardware meet the required specifications.

#### Software Requirements

##### Windows 3.1 and Windows for WorkGroup 3.11 users

You will need to be running DOS 5.0 or higher. The Microsoft Windows WIN32s Operating System Extension 1.30.166 or later is also required, this is provided on the SAS installation media and is also available from SAS Institute's ftp site (ftp.sas.com). The WIN32S extensions require almost 4 meg of disk space. Finally, if you are loading the SHARE program, which permits file sharing and record locking for networks and multitasking of programs, then the SHARE statement should be modified to include memory space for file sharing and record locks. The modified statement should look similar to the following:

```
C:\DOS\SHARE.EXE /L:500 /F:5100
```

Keep in mind, that the /L and /F switches must be specified since their default settings are 20 file locks and 2,048 bytes, respectively. SHARE.EXE is not required by the SAS

##### Special SAS Component Swap File Space Requirements

System, but may be needed by database programs or other applications running in your network environment.

##### Windows NT Users

Users of Windows NT will need to be running version 3.51 or higher. If you are running Version 4.0, be sure to install the first service pack, since possible file corruption problems have been reported. If you are using Version 3.51 and Microsoft NetWare Client software, various problems have been reported when running setup and when running DATA steps or PROCs where a dataset or catalog is being updated. For additional details on these problems, please review the *Alert Notes for the SAS System Release 6.12 for Microsoft Windows, Windows NT, and Windows 95*.

##### Windows 95 Users

For Windows 95 users, the SAS System Release 6.12 is already compatible. At our campus, we have seen a few SAS setup-related problems with some MMX computers (particularly the HP Pavilions) running Windows 95 version 4.00.950b. This version of Windows 95 contains changes to the kernel386.exe file which conflicts with the SAS System. Additional information on this problem is highlighted in the *SAS Usage Note: V6-SYS.SYS-D149*.

#### Hardware Requirements

##### Intel-based Personal Computers

PCs using an Intel or Intel-compatible 80386/33Mhz or higher CPU. Of course, performance will be greatly improved with an 80486 or Pentium machine with a 66- 200Mhz or higher clock speed. Remember that Windows NT 4.0 will not run on an 80386 processor. Finally, it is recommended that you purchase as fast a machine as your budget will allow.

##### Math Coprocessor

A math coprocessor is required, and is assumed present in the PC. The SAS System will optimize its installation for the coprocessor's presence. Be sure the math coprocessor installed is appropriate for the CPU in your system (e.g. the Intel 80387 for 386 class machines).

#### Memory Requirements

##### Windows 3.1 and Windows for Work Groups 3.11:

8 MB	minimum requirement
12 MB	for mid-range use
16 MB or more	for high performance use

Base SAS	15 MB required
SAS/AF	25 MB or more
SAS/EIS	25 MB or more
SAS/GIS	25 MB or more

Windows NT:

16 MB	minimum requirements
32 MB or more	high performance use

Special SAS Component Swap File Space Requirements

Base SAS	15 MB required
SAS/AF	25 MB or more
SAS/EIS	25 MB or more
SAS/GIS	25 MB or more

Windows 95:

16 MB	minimum requirement
32 MB or more	for high performance use

Special SAS Component Swap File Space Requirements

Base SAS	15 MB required
SAS/AF	25 MB or more
SAS/EIS	25 MB or more
SAS/GIS	25 MB or more

**Monitors**

Supported monitors included: SVGA, VGA, 8514, and XGA. EGA is not supported.

**Mouse**

A mouse is required.

**Hard Disk Requirements**

The SAS System consists of a collection of components or modules. The following table shows some of the more common components and their corresponding disk space requirements. The disk space requirements are subject to change at the discretion of SAS Institute, as are the various components listed.

<u>Component</u>	<u>DiskSpace (MB)</u>
Base SAS	16.5
Core of the SAS System (required)	60.9
SAS/Access Interface to ODBC Software	0.1
SAS/Access Interface to ORACLE Software	0.6
SAS/Access Interface to PC File Formats Software	1.0
SAS/Access Interface to SYBASE/ SQL Server Software	0.4
SAS/AF Software	1.1
SAS/ASSIST Software	7.8
SAS/CALC Software	2.6
SAS/CONNECT Software	1.5
SAS/EIS Software	28.5

SAS/ENGLISH Software	3.9
SAS/ETS Software	10.4
SAS/FSP Software	0.7
SAS/GIS Software	36.0
SAS/GRAPH Software	16.9
SAS/GRAPH Map Datasets	39.8
SAS/IML Software	2.8
SAS/INSIGHT Software	2.7
SAS/LAB Software	3.8
SAS/MDDDB Server Software	0.1
SAS/OR Software	18.9
SAS/QC Software	10.0
SAS/SHARE Software	0.4
SAS/STAT Software	11.1
SAS/TOOLKIT Software	1.7
SAS ODBC Driver	1.7
SAS Warehouse Administrator Software	4.0

Please review the *System Requirements document for the SAS System for Information Delivery Release 6.12 (TS020) Windows, Windows NT, Windows 95 November 7, 1996* for additional details for SAS/TUTOR Software and other component disk space requirements.

**OVERVIEW OF NETWARE 4.11**

NetWare 4.11 is a powerful, scalable, flexible, and reliable network services engine (NSE). NetWare 4.11 provides a single, network-based view of all network services through Novell Directory Services (NDS). The NDS database can be distributed through partitioning and replication to allow for seamless and immediate access to all network resources regardless of their global location.

NetWare 4.11 administration can be done using graphical utilities through point-and-click operations. NDS objects can be easily created, moved, or modified. Other features include flexible resource accounting and licensing management, easy installation and migration, high performance Web server capabilities, multiprotocol routing, integrated Internet Protocol (IP) support, file and print services, symmetric multiprocessing, network security, and reliability. NetWare 4.11's foundation allows for the incorporation of additional advanced services including telephony, multimedia, Internet and intranet browsing, and publishing capabilities.

NetWare 4.11 is ideal for organizations that need an open, scalable network computing architecture and that want to make optimal use of all network resources. It enables clients running different operating systems to share files and computing resources, and it allows for the management of clients and resources across multiple servers. Supported client operating systems include: Windows, Windows NT, Windows 95, UNIX, OS/2, Mac OS, and DOS. NetWare 4.11 forms the core of Novell's IntranetWare product. Features of NetWare 4.11 include:

- X symmetric multiprocessing to improve the performance and capacity of your network
- X integrated TCP/IP, with options to run IP, IPX, or both protocols on the same network

- X a DHCP server that lets you more easily manage network IP addresses
- X C2 "trusted network" security
- X new graphical administration tools to better manage network and NDS environments
- X migration tools to significantly ease account and file migration from NetWare 3
- X complete integration with Windows desktops
- X easier installation, including auto-detection of hardware to simplify system setup
- X improved recovery and error detection
- X improved performance over NetWare 4.1
- X the Novell Application Launcher, which works with Novell Directory Services (NDS) to manage desktop applications

## CONFIGURATION ISSUES AND SYSTEM REQUIREMENTS FOR NETWARE 4.11

NetWare 4.11 requires a network server computer, workstation computers, and network adapters that have been correctly configured and connected.

### Server Requirements

- X 386-based PC or higher
- X 8 MG of RAM minimum
- X 55 MB of free disk space for NetWare 4.11
- X 25 MB of free disk space for the online documentation
- X at least one network adaptor
- X network cabling
- X ISO 9660-compliant CDROM reader (with drivers for DOS and Microsoft CD extensions)

Additional server memory is highly recommended. In determining server memory, you will need to take into consideration the number of users, the load on the server, the number of loaded NLMs, and the size of the network hard disks.

Your network adapters must be compatible with the type of computer you use as a server. For 32-bit Micro Channel servers on Ethernet networks, Novell recommends the NE/2-32. For EISA servers on Ethernet networks, the NE3200 is recommended.

### Workstation Requirements

#### Server and Workstation Open Data-Link Interface (ODI) Drivers

For each workstation, you must have a network adapter and a computer running a supported client operating system. Again, the supported client operating systems include: Windows, Windows NT, Windows 95, UNIX, OS/2, Mac OS, and DOS. A minimum of 8 MB of RAM is required, though more is required depending upon the applications you plan to run.

### Backup Devices

A network backup device is strongly recommended by Novell. Over 40 backup devices are compatible with NetWare 4.11. For a complete list of backup devices, contact a Novell Platinum or Gold Partner in your area.

### Software Requirements

NetWare 4.11 contains all the software necessary to install and operate the network server and to connect as many as 1000 Windows 3.x, Windows NT, Windows 95, UNIX NFS, OS/2, Mac OS, or DOS workstations depending on the configurations.

### Windows Workstations

- X Windows 3.x, Windows NT, or Windows 95
- X NetWare Client for DOS/Windows (included with NetWare 4.11)

### UNIX NFS Workstations

- X UNIX (on workstation)
- X NetWare NFS Services 2.1 NetWare 4 Edition (installed on server)

### OS/2 Workstations

- X any version of OS/2
- X NetWare Client for OS/2 (included with NetWare 4.11)

### Mac OS Workstations

- X Mac OS System 6 or higher
- X NetWare for Macintosh 4.11 (included with NetWare 4.11)

### DOS Workstations

- X MS-DOS 3.x - 6.x, DR DOS 6.0, or Novell DOS 7
- X NetWare Client for DOS/Windows (included with NetWare 4.11)

For a comprehensive listing of ODI drivers for the server and workstation, contact a Novell Platinum or Gold Partner, or visit the Novell web site at [www.novell.com](http://www.novell.com).

**Novell Server Hard Disk Drivers**

X	Novell DCB 3.11
X	Novell ISA 3.11
X	Novell MFM 3.11
X	Novell ESDI 3.11
X	Novell IBM SCSI 3.11
X	Novell IDE 3.11

Before purchasing NetWare 4.11, you should discuss compatibility and configuration issues with a Novell Authorized Partner, or a Novell CNE. You will also need to determine what type of computer you will be using as a server and which network adapter you will be using. Additionally, you will need to plan the structure of your NetWare 4.11 directory tree. The *Getting Started with NetWare 4* manual is a good resource to help you with this task. This manual is included with NetWare 4.11 in both online and hard copy versions.

**NOVELL APPLICATION LAUNCHER (NAL)**

Access to the SAS System and other applications are key to productivity in your organization; however, getting current software and upgrades to every desktop can be costly and a tremendous chore. You need a way of giving users throughout your organization easy, consistent access to the latest version of the SAS System - regardless of their location.

The Novell Application Launcher (NAL) integrates with existing IntranetWare or NetWare 4 servers to provide software distribution, and deployment of networked applications like the SAS System. Built with the capabilities of NDS, which provides a global view of all network resources, the NAL allows you to deliver applications and data to thousands of users across your network. Thus, this will reduce the cost of managing your network and network-related services.

The NAL technology allows the administrator to define an application object, like the SAS System, in NDS and assign properties to that object. These properties are then used by the client to display an icon on the workstation and perform client tasks to launch the application. The NAL allows you to: deploy applications quickly and easily, increase business productivity, leverage your network infrastructure, and ease network growth with a robust, scalable solution.

With employees using different desktops and applications, traveling to every desktop in your organization is drudgery. The NAL, a snap-in to the NetWare Administrator console, lets you use NDS to store information about network applications for central management. To distribute the SAS System directly to desktops in your organization, you simply associate the SAS System with individual users or groups. Some that have been documented by SAS Institute's Technical Support Division include:

Novell's updated WINSOCK.DLL module

Corrects problems with signing on to a remote host from which you have just signed off when using Novell's LAN Workplace for DOS TCP/IP (Version 4.0 and 4.1) with SAS/CONNECT.

across your entire enterprise. The NAL gives you complete control over .INI and Registry files, and eliminates the task of writing scripts. Finally, the network remains secure since access to files and directories is governed by NDS.

The NAL can save you hours of time since you do not have to visit every workstation or server on your network. You can also implement simplified, or a standard desktop within your organization. Applications, like the SAS System, can be associated with groups, organizations, or the entire enterprise. Thus, new users will automatically gain access to the SAS System, as well as, other network applications or software distribution packages already created.

With the NAL, it is easy to get the latest version of the SAS System to your users. For Windows 95 and NT users, they have the added flexibility of launching applications from the Windows Explorer window, in addition to the NAL window. Because network applications are managed through NDS, they are automatically linked to users and follow them around the network. So, whenever a user logs in, he/she always sees the same set of network applications, whether they are working remotely or roaming the campus.

NAL is a powerful software distribution solution since it capitalizes on NDS to deliver applications, allowing you to leverage your current network investments and infrastructure. When installed to your server, NAL gives you affordable and effective software distribution for your entire IntranetWare and Windows NT network.

**KNOWN INTEGRATION ISSUES WITH THE SAS SYSTEM AND NETWARE 4**

As can be expected, there are a number of known integration issues that you must be aware of when integrating the SAS System within a NetWare 4 environment. First, you must be sure you have the latest NetWare 4.0 or higher VLMs. The latest VLMs are available from Novell at 1-800-UPDATE1. A few VLM related updates that have been documented by SAS Institute's Technical Support Division include:

Novell VLMs dated 10/26/93

Solves SAS log errors associated with bypassing the Print Manager when printing.

Novell VLMs dated 11/08/94 or later

Solves problems associated with opening a file from a map rooted drive letter.

Second, you will also need to have the latest fixes for your .EXE files and dynamic link library (.DLL) files. There have been a few incidents of SAS/CONNECT-related problems due to old dynamic link library files or old executables.

LWP168.EXE dated 11/23/93 or later

Corrects problems with PC workstations randomly locking up when trying to sign on using SAS/CONNECT's TCP access method.

LWP208.EXE

Corrects problems with PROC UPLOAD hanging when using SAS/CONNECT with TCP/IP access method and Novell's LAN Workplace for DOS Version 4.12.

Novell's WLBSOCK.DLL dated 8/20/91 or later and a filesize of 47,104 bytes

Corrects problems with the inability of SAS/CONNECT to locate the TCP host when using SAS/CONNECT and LAN Workplace for DOS Version 4.0.

## CONCLUSION

The integration of the SAS System for Microsoft Windows Release 6.12 in a Novell NetWare 4 environment involves many technical installation and configuration issues, which should be addressed by the SAS Software consultant or systems administrator prior to the deployment and implementation stage. With the continued growth of the Internet and organizational intranets, many organizations will continue to look for a web-based or network solution for distributing and updating the SAS System and other network applications. This in turn will open up many SAS licensing and security issues.

## REFERENCES

Microsoft Corporation, [www.microsoft.com](http://www.microsoft.com); Copyright 1997

Novell Incorporated, Getting Started with NetWare 4, Copyright 1996.

Novell Incorporated, [www.novell.com](http://www.novell.com); Copyright 1997

SAS Institute, Incorporated, Alert Notes for the SAS System for Information Delivery Release 6.12 (TS020) Windows, Windows NT, Windows 95; Dated November 22, 1996.

SAS Institute, Incorporated, Installation Instructions for the SAS System for Microsoft Windows, Release 6.12, Copyright 1996.

SAS Institute, Incorporated; System Requirements for the SAS System for Information Delivery Release 6.12 (TS020) Windows, Windows NT, Windows 95; Dated November 7, 1996.

SAS Institute, Incorporated, [www.sas.com](http://www.sas.com); Copyright 1997

Stanley, Timothy S., MS-DOS Quick Reference, Que Corporation, Copyright 1991.

Wolverton, Van and Dan Gookin, Supercharging MS DOS, Third Edition, Microsoft Press, Copyright 1991.

## ACKNOWLEDGMENTS

The author wishes to thank TRI-VAS Technologies, Incorporated for supplying a Novell NetWare 4.11 server, and for giving valuable network and systems integration recommendations.

TRI-VAS Technologies, Incorporated  
3020 Pickett Road, Suite 409  
Durham, NC. 27709  
919-846-4088 (main number)  
919-846-6467 (fax)  
[www.tri-vas.com](http://www.tri-vas.com)

Additionally, the author wishes to thank N.C. State University Computing Services without whose support this paper would not have been possible.

SAS, SAS/ACCESS, SAS/AF, SAS/ASSIST, SAS/CALC, SAS/CONNECT, SAS/EIS, SAS/ENGLISH, SAS/ETS, SAS/FSP, SAS/GIS, SAS/GRAPH, SAS/IML, SAS/INSIGHT, SAS/LAB, SAS/MDDDB, SAS/OR, SAS/QC, SAS/SHARE, SAS/SPECTRAVIEW, SAS/STAT, SAS/TOOLKIT, SAS ODBC, SAS Warehouse Administrator, and all other SAS products are registered trademarks or trademarks of SAS Institute Incorporated in the USA and other countries.

® indicates USA registration

Other brand and product names are registered trademarks or trademarks of their respective companies.

Author Contact Information:

Gerardette M. Furlow  
N.C. State University Computing Services  
2620 Hillsborough Street  
Raleigh, North Carolina 27695-7109  
[gerri@ncsu.edu](mailto:gerri@ncsu.edu)  
919-515-5419 (phone)  
919-515-3787 (fax)